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MANAGEMENT PRACTICES FOR CHRISTMAS TREE PRODUCTION

by

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A PICTORIAL ACCOUNT OF MANAGEMENT PRACTICES FOR CHRISTMAS TREE PRODUCTION IN DOUGLAS-FIR STANDS OF THE NORTHERN ROCKY MOUNTAINS

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by

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INTRODUCTION

The production of Christmas trees has become a major industry in many sections of the Northern Rocky Mountains. Approximately 3,300,000 trees valued at around one million dollars at the shipping points 2/ were cut in Montana alone in 1946. Christmas trees have become an important additional crop to many farmers and small forest owners as well as to the larger timber land owners.

Safeguards are needed if this industry is to be supported at its present level or expanded. There are three sure ways of reducing future Christmas tree yields from any area 3/. These are: (1) to cut too slowly, thus permitting the trees to grow out of merchantable size; (2) to cut too rapidly, thus reducing the growing stock and inviting a long period of inactivity while the lands restock; and (3) to employ unsound cutting practices, which adversely affect the quantity and quality of future crops.

Although the Christmas tree industry is relatively new to the northern Rocky Mountains, substantial progress has already been made in working out management methods for continuous and maximum production of this important forest land crop. Despite a short life, the industry has made great inroads in most accessible areas. Recognition of the threat of future curtailment of operations has led interested organizations and individuals to seek better management practices. Christmas tree companies, private land owners, and federal and state agencies have all had a hand in developing these methods. The following pictures illustrate some of the more important problems met with in the growing and harvesting of Christmas trees and the solutions being worked out.

1/ Acknowledgement is made to Stanford H. Larson, formerly with the U. S. Forest Service, for aid in obtaining photographs of cultural practices and for many of the ideas on management given in this paper.

2/ Holmes, Paul N. and Russell K. LeBarron, "Montana Christmas Tree Production Highest on Record." Northern Rocky Mountain Forest and Range Experiment Station Research Note No. 5, March, 1947.

3/ Hutchison, S. Blair, "The Forest Situation in Lincoln County, Montana," Northern Rocky Mountain Forest and Range Experiment Station, Forest Survey Release No. 20, March, 1942.

THE CHRISTMAS TREE STAND

The typical Christmas tree stand is second-growth Douglas-fir resulting from a logging operation which removed the virgin forest. Frequently it originated beneath the protection of the old-growth and was well established at the time of logging. It may vary greatly in age and size of tree; age may range from newly established seedlings to clumps of saplings and poles with scattered old-growth overtopping all. A mixture of species including Douglas-fir, western larch, lodgepole pine, ponderosa pine, and Engelmann spruce, may be present. Some trees occur singly, and some in thickets. Openings without trees may be numerous.

The purpose of Christmas tree management is to establish and maintain a growing stock which will yield the greatest number of crop trees annually. It means regulating the density of the stand through harvesting and cultural measures to obtain full stocking and yet provide adequate growing space for each tree at the proper time. It means preventing trees from growing out of merchantable size and removing those from the stand which have become too large. It means planned provision for an adequate seed source for abundant regeneration. It means artificial forestation of favorable openings which do not regenerate naturally at the proper rate. And it means an intensive network of roads which make possible intensive management for sustained and maximum production.

A good stand for Christmas tree production if cultural practices are followed. Stocking is full and seed trees are numerous. Overwood trees not needed for seed should be worked out for fuelwood, cross ties, etc. The young stand needs thinning, pruning and weeding if it is to sustain production of good quality Christmas trees.

A natural opening in the stand used for yarding Christmas trees.

A well-developed road system, making all parts of the stand accessible is a prerequisite to Christmas tree production. Illustrated is a typical major road with a feeder road joining it in the right foreground.

CULTURAL OPERATIONS

Christmas trees, like any other crop, require certain cultural measures for maximum yields. Full stand density is a prerequisite to full production. But density must be controlled by cultural means to allow each tree space for full crown development in the shortest possible time. Cultural methods include thinning, pruning, weeding, liberation cutting, and stump culture.

Thinning has for its purpose the regulation of spacing in crowded stands. Thinning should accomplish proper vertical as well as horizontal spacing. Proper vertical spacing means maintaining trees of differing heights in the same stand. Hence, the removal of taller trees will release smaller trees for future cuts. Thinning is often accomplished by the harvesting operation when carefully done. However, some additional thinning is frequently necessary to provide space for good crown development. Too much thinning may make the reserved trees subject to wind and snow damage. There is no set rule for proper spacing. The larger trees that are nearing merchantable size need sufficient room for growth of dense, symmetrical crowns. Smaller trees that are being held for later development after harvesting of their larger neighbors can temporarily be left rather crowded and shaded. Thinning must be done carefully or the stand will be harmed rather than improved. A good rule is to thin lightly and often.

Pruning is one of the most debated measures. Some growers believe that pruning retards height growth, thus forcing the top to develop a thicker, better-foliaged crown of deeper color. A few believe that pruning does not have much value. Studies are now under way by the Western Montana Work Center of the Northern Rocky Mountain Forest and Range Experiment Station to determine the effects of pruning. It seems likely that rather severe pruning or slashing the bark from two sides of a tree will stunt height growth and result in a denser top. Light to moderate pruning probably does not affect top development a great deal, but it may give more space for crown development of other trees.

Weeding is the removal of trees and shrubs such as western larch, lodgepole pine, birch, serviceberry, willow, and maple which interfere with the development of Douglas-fir Christmas trees. As these species usually grow more rapidly than Douglas-fir, they frequently overtop and suppress it. In such instances a weeding may be in order to release potential Christmas trees. Weedings, however, should be made when the stand is young and the job can be cheaply accomplished. Weedings should be made only when needed, and then very carefully.

Liberation cutting removes trees which have grown out of merchantable size for Christmas trees, and other overwood trees not needed for seed. Such cuttings are needed to hold the stand for Christmas tree production. Overwood trees should be worked out for such products as fuelwood, cross ties, posts, poles, sawlogs and pulpwood. Some overwood trees are unmerchantable because of rot, crook, or other defect. These should be felled, girdled or poisoned to give space to young trees beneath.

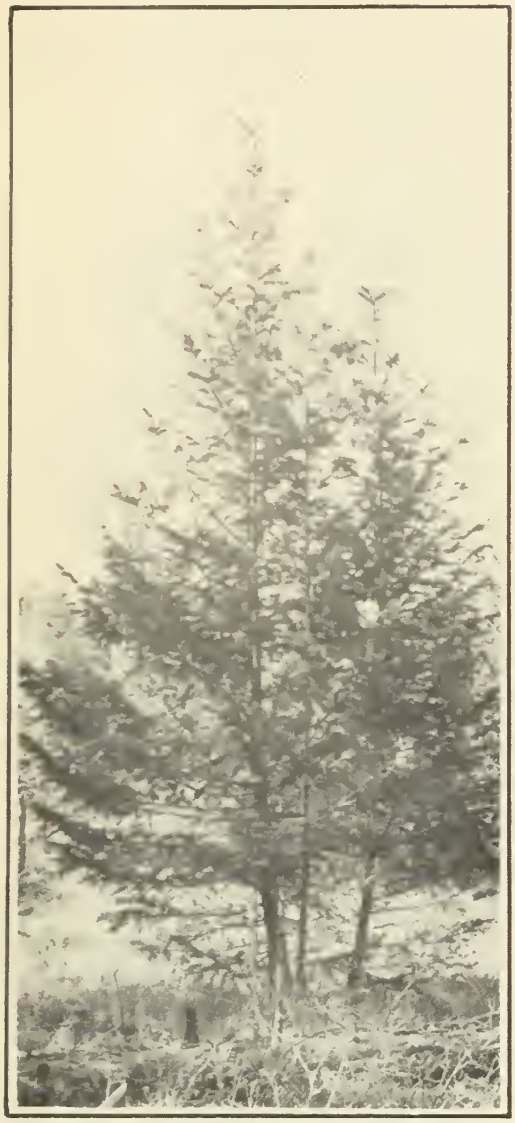
Stump culture is one of the most interesting practices in the growing of Christmas trees. By this means one or more trees are grown from the stumps of harvested trees. These new trees originate either from branches which turn up and develop into new leaders, or from adventitious buds. Stump culture results in faster growth because a well-developed root system is available to feed the new crown, and it removes the grower from complete dependency on the slower and less certain process of natural or artificial regeneration. The practice may be very detrimental if done carelessly and if stump branches are left untended. But when carefully applied, stump culture has a beneficial and definite place in the growing of Christmas trees.

Stump culture is best practiced where the tree is growing alone in an opening. Through proper pruning, successive branches can be developed into well-formed Christmas trees. In this way the opening continues to produce trees until such time as regeneration can become established.

Stump culture is most harmful when attempted in thickets. Here the branches bush out and form a "wolf tree" which so crowds its neighbors that none can develop properly. Stumps in thickets should usually be killed. Untended living stumps usually develop two or more leaders which result in the growth of forked trees.

To be successful, stump culture requires careful attention on the part of the grower. Followup in the form of one, two, or three prunings is necessary to control and train the stump branches so they will not interfere with each other but will form successive trees. Unless this followup can be made, it is usually better practice to kill the stump at the time of cutting the original tree.

Before Thinning

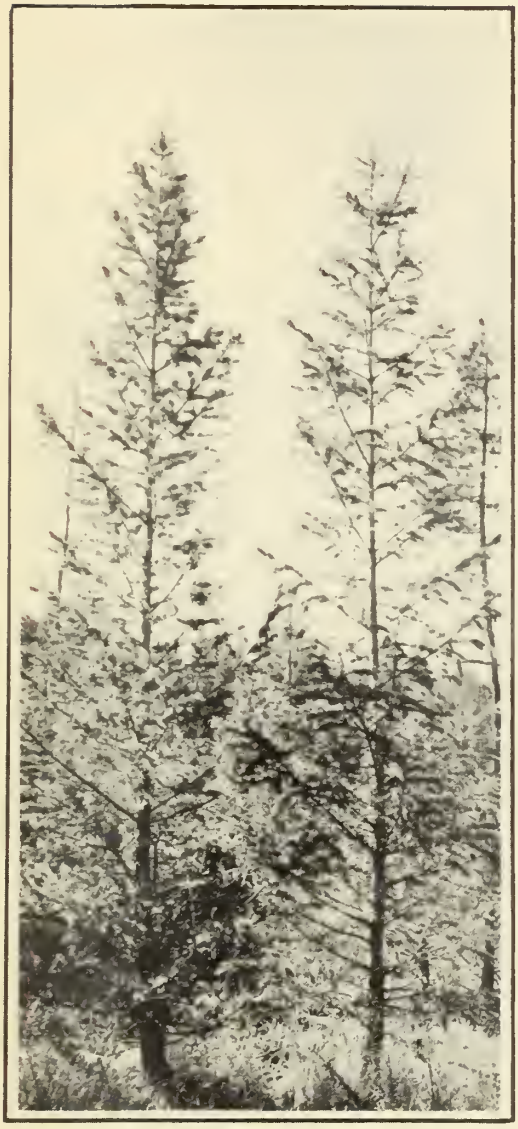


A group of trees so crowding each other that none is able to develop a well-formed crown suitable for a Christmas tree. The tree to the left has had the top cut out for a Christmas tree some years ago, and now two branches have become leaders and neither can develop a well-formed crown.

After Thinning

The same group after thinning. The middle tree and one of the leaders of the tree to the left have been removed. The remaining leader of the tree to the left now has space to develop a well-formed crown. When it is cut for a Christmas tree, the trees on the right will have space for good crown development.

Before Pruning



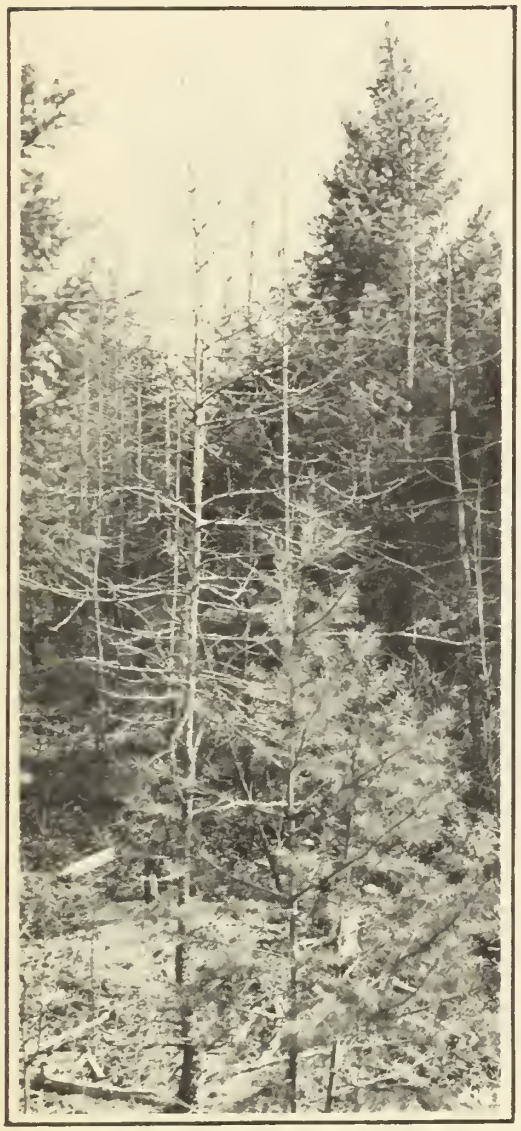
Two trees with crowns too thin and poorly formed to make Christmas trees.

After Pruning

The same trees after pruning to force top development. It is questionable whether these trees have been pruned heavily enough. Pruning frequently releases the crowns of smaller trees.

Weeding

Before Weeding



A stand of potential Christmas trees overtopped and crowded by western larch. As long as the faster-growing larch remain, the Douglas-fir cannot develop into Christmas trees.

After Weeding

The same stand after weeding out the larch to allow full development of the Douglas-fir.

Liberation Cuttings

If this stand is to continue to produce Christmas trees, overwood trees not needed for seed should be worked out for fuelwood, cross ties, logs, or pulpwood. Defective, unmerchantable trees should be felled, girdled, or poisoned to give space for younger trees.

Closeup of the stem of a tree showing a stub where the leader has been cut for a Christmas tree several years ago. A new leader, formed by a lateral branch, is developing into a second Christmas tree.

The same situation as to the left. The man holds the stub of the main leader cut about 12 years ago. A branch has developed into the well-formed tree at the left.

Before Treatment

Here the leader was cut for a Christmas tree 12 or 14 years ago and two lateral branches turned up as leaders, but they so crowded each other that neither was able to develop into a tree.

After Treatment

The same tree after removing the poorer of the leaders and pruning to force development of the remaining leader. A branch has been left to form another tree when the leader has been cut.

Stump culture is best practiced in openings occupied by single trees such as that pictured above. This tree has already produced two Christmas trees and with proper pruning of branches may yield several more.

When only the leader is cut from a tree in a thicket, the remaining branches frequently develop into a "wolf tree," as in the photo to the left, which crowds nearby trees and prevents any from developing properly. Trees such as this should be cut at the ground line or stripped of stump branches.

REGENERATION

The usual and most important method for regenerating Christmas tree lands is by natural seeding. At least four to six well-spaced trees, eight inches or greater in diameter at breast height, should be reserved per acre throughout each area devoted to Christmas tree production to furnish seed for regenerating openings. Seed trees should be vigorous, full-crowned trees.

Frequently, when seed trees are not present, or for other reasons, openings which do not regenerate very rapidly occur in the stand. Many of these need to be forested artificially for maximum production of Christmas trees. Planting of young trees is the most successful artificial method. Planting stock of Douglas-fir which has been in the seedbed two years and in the transplant bed two years has proved satisfactory for this purpose.

Most Christmas tree stands contain numerous openings, such as the one pictured, which are not regenerating very rapidly. Many of these need to be forested artificially for maximum Christmas tree production.

In planting these openings, advantage should be taken of the protection afforded by down logs and stumps by planting on the northerly side of these. Illustrated is a planted stand seven years of age.

DAMAGE TO STANDS

Like any other forest crop, Christmas trees are subject to damage by various agents. Fire, insects, disease, weather, and animals may damage or destroy Christmas tree stands. The grower must always be on the alert to protect his crop when protection is possible and practical. Following is a brief discussion of the more important causes of damage.

Fire

Good fire protection is essential, of course. One measure the Christmas tree operator can take is to prevent the accumulation of debris from cutting. In addition to being a physical obstacle to future operations, it constitutes a serious fire hazard.

Insects

Among the insect pests of Douglas-fir, Cooley's louse is a serious threat to Christmas tree growing. In its most conspicuous form, it appears on the underside of Douglas-fir needles as small, cottony tufts. Control is most difficult, because of a rather complicated life cycle. The application of a miscible oil spray during the short period of time of the egg or early developmental stages has been recommended as giving satisfactory control. Feasibility of control in the Christmas tree stand remains to be determined. 1/

The possibilities of other defoliating insects such as the Tussock moth should not be overlooked. Aerial spraying of DDT has been found to be an effective method of control for the Tussock moth.

Diseases

Rocky Mountain Douglas-fir is especially susceptible to a fungus known as needle blight or needle cast of Douglas-fir. The disease attacks young trees primarily. First symptoms appear in autumn or

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1/ Letter from James C. Evenden, In Charge Forest Insects Laboratory, Coeur d'Alene, Idaho, Division of Forest Insects, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, to U. S. Forest Service, summer of 1946.

commonly early winter as yellow spots on the needles. By spring the spots change to reddish brown giving the leaves a mottled appearance. When severe, the disease kills all the needles except the youngest and the trees in mass appear to have been badly scorched. No feasible control measure for application in the Christmas tree stand has yet been developed. 2/

Douglas-fir trees on thousands of acres were ruined for Christmas trees in 1947 by a discoloration and premature fall of current year's needles. The cause is not yet entirely clear. The needles show infection of Douglas-fir needle cast, but in addition, insects and mites have been reported. No control is as yet known.

Weather

Weather on occasion is an agent of damage over which man has no control. Hail may injure trees beyond possible immediate use as Christmas trees. However, they may recover merchantability with a few years' additional growth.

Heavy snow may cause irreparable damage. If the stand is kept in the best growing condition through cutting and cultural practices, damage from this source will be greatly minimized.

Unseasonal frost, such as late spring frosts, may cause damage. Young succulent current growth is killed, usually deforming the tree for Christmas tree use. Here, again, trees will outgrow this condition and become merchantable in the course of a few years.

Animals

Deer browsing on young Douglas-fir is a threatening factor in some Christmas tree stands. This is normally true only where the stand is overpopulated by deer.

Grazing by livestock in the Christmas tree stand may be detrimental to natural restocking. If the cattle are numerous, the young seedlings are trampled to death. Under some conditions, browsing and rubbing will cause damage. Fencing out cattle will prevent injury of this kind.

2/ Letter from Jesse L. Bedwell, In Charge, Portland Office, Division of Forest Pathology, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, to Northern Rocky Mountain Forest and Range Experiment Station, November 12, 1947.

Douglas-fir trees on thousands of acres were ruined for use as Christmas trees in 1947 by a needle cast, and perhaps other agents, which caused discoloration and defoliation of current year's needles. No practical control is yet known for this type of damage.

DEBRIS FROM CUTTINGS

Proper treatment of debris resulting from Christmas tree cuttings is important to reduce the fire hazard and to remove the physical obstacle to future cuttings. The limbs should be cut from long butts and the slash scattered. All material should be placed as closely to the ground as possible to hasten rotting and breaking up. Care should be taken that slash does not injure or cover seedlings or small trees. In openings, slash may be scattered to provide shade and a better environment for the establishment of seedlings. Sometimes where concentrations of slash occur, it should be piled and burned to reduce the fire hazard.

Disposal of Slash

Before Treatment

All too frequently this is the condition after Christmas tree cuttings. The result is a fire hazard, a jungle for future cutting operations, and damage or death to buried seedlings.

After Treatment

The same area after lopping slash to get it flat on the ground where it will break up more quickly. The hazard has been reduced, the slash is not a physical obstacle to the next cutting, young trees are not smothered.

With careful management, Christmas trees will continue to be an important forest land crop in the northern Rocky Mountain region.

LIST OF PREVIOUS PUBLICATIONS IN THIS SERIES

Station Paper No.	
1	*A preliminary study of root diseases in western white pine, by John Ehrlich, October 1939.
2	*Possibilities of partial cutting in young western white pine, by E. F. Rapraeger, January 1940.
3	Blister rust control in the management of western white pine, by Kenneth P. Davis and Virgil D. Moss, June 1940.
4	Possibilities of wood-pulp production in the northern Rocky Mountain region, by E. F. Rapraeger, March 1941.
5	Results to date of studies of the durability of native woods treated and untreated, by C. N. Whitney, revised January 1946.
6	Changes in Benewah County Forest statistics, by Paul D. Kemp, July 1947.
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8	Pole blight, a new disease of western white pine, by C. A. Wellner, November 1947.

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